

SOIL SURVEY OF UPSHUR COUNTY, WEST VIRGINIA.

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LOCATION AND BOUNDARIES OF THE AREA.

Upshur County lies slightly to the northeast of the center of West Virginia, in about 80° west longitude and 39° north latitude. The county has an extent of 330 square miles and is somewhat irregular in shape, with an extreme length of about 30 miles and a width of about 16 miles. It is bounded on the north by Harrison and Barbour counties, on the east by Barbour and Randolph, on the south by Randolph

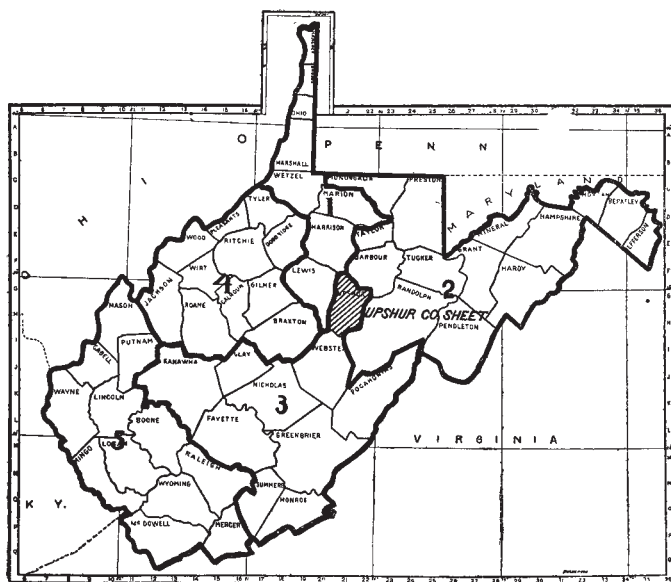


FIG. 5.—Sketch map showing location of the Upshur County area, West Virginia.

and Webster, and on the west by Lewis. Buckhannon, with a population of 3,000, is the county seat and principal town, and is located in the north-central part of the county.

HISTORY OF SETTLEMENT AND AGRICULTURAL DEVELOPMENT.

In 1765 two deserters from the British army at Fort Pitt made their camp at the mouth of Turkey River, a short distance north of the

present town of Buckhannon. The French and English were then at war, and the fugitives spent their time in hunting and trapping until peace was declared, nearly two years later. They then returned to the settlements on the south branch of the Potomac, hoping to persuade settlers to join them in the newly explored region. In this they were successful, and in 1769 farms were located and improvements started, and during the next few years many permanent settlements were made along Turkey Run, Hackers Creek, and the Buckhannon River.

Beginning in 1801 many New England families made the long overland journey across the mountains and established homes within the present boundaries of Upshur County. Permanent settlements were made at French Creek, Sago, Hollygrove, and other points, and this class of settlers continued to come for the next fifteen or twenty years. Drawn as they were from different points, and coming from different ancestral stocks, the habits and customs of the Virginians and New Englanders were not always in accord, but a gradual blending took place, and a large majority of the present residents of the county are descended from these two sources of early immigration.

Considerable trouble was experienced in the early days as a result of conflicting land grants. In a few cases farmers were compelled to pay a second and third time for their land before receiving a clear title. This feature was discouraging, and about 1830 many of the New Englanders moved to Illinois and others to far western points, where more fertile lands with clearer titles could be secured. The settlements suffered from Indian depredations in common with the other frontier points of that period.

Corn was the principal crop cultivated by the Virginians, as it was also their main source of food. The New Englanders brought seeds of the principal garden vegetables, which added considerable variety to the pioneer's table. Sheep and cattle were introduced in 1809 and 1810, and the grazing industry has gradually developed until it has become the leading feature of the county's agriculture.

The first steps toward organizing the county were taken in 1848, when an act was introduced in the Virginia legislature with that object in view. The organization was finally effected in March, 1851, by the passage of an act establishing the county from parts of Lewis, Barbour, and Randolph counties. It was named in honor of Abel P. Upshur, a prominent resident of lower Virginia and a member of the Cabinet during President Tyler's administration.

CLIMATE.

The climate of Upshur County is healthful and the waters of the area are pure. Neither the summer nor the winter seasons are subject to extremes of temperature. The rainfall is abundant and well dis-

tributed throughout the year. The spring is likely to be wet, and while this hinders planting somewhat, it is favorable to the grazing industry. The area of high altitude in the southern part of the county receives frequent showers during the summer season.

The average date of occurrence of the last killing frost in spring is April 26, and of the first in fall is October 7. The records of the Weather Bureau at Buckhannon and other neighboring points have been kept for but a short period and are not complete, so that no normals for either temperature or precipitation can be given. A table follows, showing two years records at Philippi, which is situated about 20 miles northeast of Buckhannon, at a somewhat lower elevation.

Monthly and annual temperature and precipitation.

Month.	1903.		1904.		Month.	1903.		1904.	
	Temper- ature.	Precipi- tation.	Temper- ature.	Precipi- tation.		Temper- ature.	Precipi- tation.	Temper- ature.	Precipi- tation.
	°F.	Inches.	°F.	Inches.		°F.	Inches.	°F.	Inches.
January	32.4	4.72	27.6	3.11	August	70.2	2.40	69.8	2.79
February	33.1	5.86	29.6	2.12	September ..	63.4	2.29	65.8	2.82
March	50.2	5.36	44.4	4.03	October	52.8	3.00	51.0	1.74
April	51.7	4.24	47.0	2.37	November ..	37.2	3.41	39.0	0.46
May	63.8	3.92	61.0	2.47	December ..	25.1	2.49	31.6	4.29
June	64.8	5.03	68.6	5.71	Year ..	51.3	46.46	50.5	35.52
July	71.2	3.74	70.4	3.61					

PHYSIOGRAPHY AND GEOLOGY.

There are three physiographic divisions of the Appalachian province, consisting of the great system of mountains on the east, the central valley, and the Cumberland plateau. This plateau is formed of sedimentary rocks in nearly horizontal strata, which were laid down in a great interior sea. They have since been elevated and greatly dissected by stream agencies, so that little semblance of their former level, continuous character remains.

Upshur County lies wholly within this dissected plateau, and its topography is characteristic of the division. There is no portion of the county that is not hilly and much of it is rough and broken, while the southeastern and southern parts can be called mountainous. In the northern part the tops of the hills are from 1,600 to 1,800 feet above sea level and the valley floors from 1,100 to 1,400. The elevation gradually increases until in the southern part the hills are from 2,500 to 3,000 feet and valleys about 2,000 feet above sea level. The general dip of the rock is slightly to the northwest. The maximum thickness of these sedimentary rocks is about 4,800 feet.

Most of the drainage of the county is northward through the Buckhannon and Middle Fork rivers and their tributaries. The southwest corner belongs to the Kanawah system, and a small area in the northwest drains into the Monongahela. Small streams are numerous, with

many branches which reach back into the hills and usually start abruptly from a widened gorge.

As classified in the Buckhannon folio of the United States Geological Survey, the surface exposures of Upshur County belong entirely to the Carboniferous period, which is represented by three different formations. They are known as the Pugh, Upshur sandstone, and Braxton, and belong to groups designated, respectively, as Lower Coal Measures, Lower Barren Measures, and Upper Coal Measures.

The process of erosion has been rapid in the area, so that only a comparatively thin mantle of soil has been allowed to collect over the rock surfaces, especially in the southern part of the county. Carved as they are from nearly horizontal strata of unequal hardness, the valleys present a somewhat uneven surface along their sides. This proximity of bed rock and the position of its strata in relation to the plane of the surface makes the presence of a stony loam type over a large part of the area a certainty.

The Pugh formation consists of dark-colored shales and brown sandstones and is found to a limited extent in the high southeastern part of the county. The soil type derived from it is chiefly the Dekalb stony loam.

The Upshur sandstone comprises the greater portion of the middle, eastern, and southern parts of the county. It consists of fine and coarse gray, brown, or yellowish sandstones, with occasionally some conglomerate, and is interbedded with layers of soft shales. The hillsides are steep and often precipitous, being held up by the hard sandstones which often jut out in a continuous line for long distances along a valley side, scattering the slope below the outcrop with great gray blocks and smaller fragments. The valleys are from 300 to 500 feet deep, and the streams are still cutting their channels deeper.

The disintegration of this formation has given rise to three types of soil. The Dekalb stony loam occurs where the clay shales and finer sandstones predominate, while the Rough stony land is found where the coarser sandstone has given the interstitial material a more or less sandy character, and, at the same time, has strewn a large number of bowlders over the soil. The tops of the hills in this formation are frequently of considerable extent, and nearly flat and free from stones. A majority of these areas have been classed as Dekalb loam.

The Braxton formation is found in the northern and northwestern parts of the county, and consists of yellow, green, and red shales, with a few layers of brown sandstone. The greater portion of it has weathered into the Dekalb clay. Most of the hillsides are steep, though many well-rounded slopes are in evidence. Many of the ridges are narrow and long. The streams of this section usually have a narrow strip of bottom land along them. From the green and red shales another type—the Upshur clay—has been derived.

The coal of the area has been practically unexploited as yet, though it is mined locally and for shipment in one or two cases. Practically the whole area is covered with coal seams of some description, many of them valuable and others of lower grade. A few small gas wells have been found, but no oil. The sand from a part of the Upshur sandstone is of excellent quality for glass manufacture, and the stone is crushed and used extensively for this purpose.

SOILS.

Six distinct types of soil are found in Upshur County. The area of each of these is given in the following table, while their distribution is shown by color in the map accompanying this report:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Dekalb stony loam	82,560	39.1	Upshur clay	13,504	6.4
Rough stony land.....	48,512	22.9	Meadow	11,008	5.3
Dekalb clay	40,768	19.3	Total.....	211,264
Dekalb loam	14,912	7.0			

DEKALB LOAM.

The Dekalb loam is very similar in appearance and general character to the Dekalb clay, but it occupies a different topography and is lighter, both in texture and color. For 9 inches it is a yellowish loam, having a brown surface. The subsoil, to a depth of 3 feet or more, is a pale-yellow clay, or occasionally clay loam. Locally the soil contains considerable fine sand, and, in some sections, has a silty nature for a few inches. Fragments of sandstone are frequently found scattered over the areas. The soil often rests directly upon a bed of sandstone within 4 or 5 feet of the surface.

The Dekalb loam is found in the central-eastern and southern parts of the county in connection with the Dekalb stony loam. The type occupies the rather flat tops of nearly all the hills and ridges in the sections where it is found, and the extent and form of each individual area is dependent upon the size and slope of the hill. In most cases its topography is very gently rolling and the drainage rapid, though not sufficiently so to do much damage through erosion.

The Dekalb loam is derived directly by weathering from fine-grained sandstone or sandy shales, which underlie it in nearly a horizontal position. In this latter respect the soil differs from the other types of the area. Most of the areas come from the Upshur sandstone formation, though in the central part of the county the Braxton caps many of the hills. The distinction between the Dekalb loam and Dekalb clay is frequently not very decided along the general boundary

between the two types, but it becomes very evident upon the hills farther to the southward.

The area upon which the larger part of the town of Buckhannon is situated is found at a much lower level than the greater part of this soil, and is derived from a layer of sandstone which was formerly exposed by the cutting action of the river. It has weathered into a few inches of gray, rather silty loam, which changes into a yellow loam, and finally becomes a yellow clay at about 10 inches from the surface. This soil area is free from rock fragments.

Naturally the Dekalb loam is not a very fertile soil, a fact indicated by its lighter color and the low content of organic matter. Its texture, however, makes it responsive, and it is capable of being brought to a satisfactory state of productivity if given proper attention. It should receive barnyard manure and some form of green manure whenever possible. Many of the areas in the southern part of the county are still in chestnut, oak, and poplar forest.

One drawback to the successful cultivation of a large number of these soil areas lies in the fact of their isolation. Long distances over rough, hilly roads usually separate them from the railroad, and there is little effort made to grow marketable products. Hay, corn, oats, and potatoes, with occasionally a little wheat, are the usual crops. It is the best potato soil in the area and produces tubers of excellent quality, as well as satisfactory yields. During dry weather the crops upon this soil suffer some from lack of moisture, owing to the high, exposed position of the soil and its proximity to bed rock. Corn produces about 25 bushels and oats from 20 to 25 bushels per acre. Wheat will not average more than 10 bushels per acre. All kinds of fruits do well. The areas of this soil are practically the only ones in the rougher parts of the county upon which hay may be grown satisfactorily.

The following table gives the average results of mechanical analyses of typical samples of the fine earth of the soil and subsoil of the Dekalb loam:

Mechanical analyses of Dekalb loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
13337, 13339	Soil	0.4	1.9	3.1	15.8	10.4	46.2	21.8
13338, 13340	Subsoil	1.2	3.4	4.2	14.2	9.7	38.8	28.3

MEADOW.

The areas classified as Meadow consist entirely of bottom lands along the streams and occur principally in the northern part of the county. The streams in this section have cut more nearly to their base level of erosion than have most of those of the remainder of the county, and their force is now spent in widening rather than deepening.

ing their channels. For this reason more or less sediment is found along these stream courses.

The largest continuous areas are found along Fink and Turkey runs, Brushy Fork, and the Buckhannon River. Because of the variable character of these bottoms and the comparatively small areas occupied by them it was not found practicable to separate them into distinct types. A few areas are one-fourth of a mile wide, but the majority are less than one-eighth of a mile in width for the greater part of their extent. The lands are somewhat low and sometimes boggy, but with a few exceptions are not subject to periodic overflow.

While these bottoms vary greatly, even in a single field, and it was not practicable to separate the different soils, there are three classes which can be generally described. These depend somewhat upon the character of the country from which the stream issues, and also upon the type of soil occupying the immediate surrounding hills.

The first of these and the most valuable consists of a heavy brown loam for 8 or 10 inches, which is underlain by a yellow or dark-colored clay loam or clay. This phase is seen about Buckhannon "Island" and at other points along the river and other streams. Its position is higher than the average Meadow area, and it produces excellent yields of hay, corn, and oats.

The lowest and heaviest part of the Meadow consists of 10 inches of gray silty loam, underlain by a heavy, plastic, drab clay. These areas are quite extensive. As a rule they are too wet and soggy for corn, and hay forms the sole crop.

Sandy areas of Meadow occur at different points along the streams, and especially along Middle Fork, Kanawha River, the upper part of Buckhannon River, and the larger creeks. This phase varies from a fine sandy loam to a medium yellowish sand. The areas are usually under cultivation and give fair yields of corn and potatoes.

As a whole the Meadow lands are the most valuable in the county, since it is from them that the greater part of the hay is cut. They are left in grass permanently and yield from 1 ton to 1½ tons of hay per acre. Some of the higher and more loamy portions are occasionally planted to corn and yield in good seasons from 40 to 50 bushels per acre. There is a tendency for the grasses to deteriorate and become coarse in the lower portions of the fields. This has been remedied by ditching in some cases, but there are still many areas which would be greatly benefited by this treatment. The application of lime as a top dressing is also to be recommended.

ROUGH STONY LAND.

The areas of Rough stony land occur upon the steeper hillsides throughout the central, eastern, and southern parts of the county. The presence of the type is due to the fact that in the Upshur sand-

stone formations there are certain strata of a massive gray sandstone, from 5 to 20 feet thick, which run through all the hills in a nearly horizontal position, and project as ledges upon the sides of the valleys. Usually the slopes have but a single outcrop upon them, and its relative position upon the hillside is controlled by the elevation of the hill and the height to which the dip of the formation has caused that particular stratum to rise. Occasionally it crowns a hill, and again it may appear only near the bottom of the valley. Below the projecting ledge the hillside is almost invariably strewn with boulders and rectangular blocks, sometimes from 20 to 50 feet in length. Many fragments and smaller boulders are strewn over the soil and incorporated with it. In nearly every case the soil as mapped occurs below one of these ledges. Frequently many boulders and stones have collected in the bottoms and along the lower slopes of narrow valleys, together with more or less wash sand, thus giving rise to a small strip of the soil along the streams.

The greater part of the interstitial material is derived by weathering from the finer-grained sandstones and shales which occur between the massive beds. For this reason it is much heavier than if derived from the gray sandstone alone, though the influence of the latter has been considerable.

Over the larger part of the Rough stony land even the possibility of profitable agriculture is very slight, although a few small areas are cleared and under cultivation and some are in pasture. The greater part still remains in forest or has been cut over and is covered with small second growth. The timber consists of chestnut, white oak, poplar, chestnut oak, and near the streams considerable hemlock. It is thought that by far the larger part of this soil should be allowed to reforest itself.

UPSHUR CLAY.

The soil of the Upshur clay is a stiff dark-red clay, 6 or 7 inches deep. This passes into a red clay subsoil of similar character but lighter in color. Occasionally it has nearly a pink shade and also contains small bands of partially disintegrated greenish or yellowish shales. The soil in some cases is somewhat loamy and in others there is practically no textural difference between soil and subsoil. Locally it is scattered with a few sandstone fragments. The heavier portions bake hard and crack during dry weather. It is called "red clay" or "mulatto soil."

With the exception of Meadow this type is the least extensive soil in the area. It occurs principally in the northwest corner of the county in connection with the Dekalb clay, and on the whole is not especially important agriculturally.

Nearly all the areas of the Upshur clay are found upon very steep hillsides, frequently occupying the steep, amphitheaterlike rim about

stream heads, or occurring in a strip along valley sides well up toward the top of the hill. Occasionally it crosses the hill through a low divide and extends into the valley on the other side. It suffers much from erosion. Possibly one-third or more is unfit for agricultural purposes because of its steep-gullied slopes.

The Upshur clay is a direct product of the weathering of the green and red shales that underlie it. In themselves they are comparatively soft and friable and disintegrate quickly when exposed. In many cases where the soil occurs, a protecting cap of harder shales, and more often sandstone, is found upon the crown of the hill. This feature has been largely responsible for the steep character of the type, since it has equalized erosion.

Most of the soil is kept in permanent pasture. This is so because of the difficulty in cultivating the steep hillsides and their tendency to wash, and also for the reason that the soil within itself is very tenacious and difficult to till. When found upon lower hill slopes or in a moderately rolling position it is likely to be much more loamy and is very productive for wheat and corn, as well as being a good grass soil. Much of it has been nearly ruined by excessive cropping to corn and other crops when first cleared. Wheat will yield about 18 bushels per acre and corn from 35 to 50 bushels per acre if given proper attention and some fertilizer.

The following table shows the average results of mechanical analyses of typical samples of the soil and subsoil of this type:

Mechanical analyses of Upshur clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
13319, 12828.....	Soil	1.3	3.3	1.6	5.4	7.4	34.2	46.5
13320, 12829.....	Subsoil.....	.9	5.3	2.8	5.7	4.5	28.6	52.1

DEKALB CLAY.

For the first 2 or 3 inches the soil of the Dekalb clay is usually a brown and occasionally a gray loam. Thence to a depth of 10 inches it is a yellowish clay loam, at which point it grades into a dark yellow clay, which continues to a depth of 3 feet or more. There is no distinct line of division between the soil and subsoil. Fine pieces of yellowish shale and fragments of sandstone are usually scattered through it, sometimes in considerable quantities, thus making the soil appear somewhat coarser in texture and more open in structure than an analysis of the fine earth shows. A phase having a more loamy and deeper soil is common in limited areas, especially in small coves and upon lower hill slopes. The soil on the hilltops is also somewhat lighter in texture, but such areas are of small extent. Areas of Upshur clay too small to be represented upon the map are

numerous in some localities. The soil rests upon a mass of broken shale, which is sometimes within 3 or 4 feet of the surface, but usually considerably deeper. Outcrops of this shale are common and give rise to small areas designated locally as "slaty land."

The type covers the larger part of the county north of Buckhannon and also extends down its western edge several miles. The section comprises the best agricultural lands of the county and covers from one-fourth to one-third of its area.

The usual topography of the areas occupied by the type is hilly and sometimes rough. In some cases characteristic well-rounded shale hills occur and along the larger streams the slopes of the hills are oftentimes gentle, but upon the whole the type occupies steep slopes. In many cases the hills converge to a sharp peak, and the tops of the divides are but a rod or so wide. The roadways follow the streams and where the streams end wind to the top of the ridge only to descend immediately into the next valley.

Such being its position, the Dekalb clay is likely to suffer more from excessive drainage and destructive erosion than some of the other types of the county. However, the presence of deep gullies upon the hillsides is not a prominent feature of the soil.

The Dekalb clay is largely a residual soil, derived directly from the underlying yellowish clay shales by the process of weathering. These shales contain thin strata of sandstone, and it is from this source that the rock fragments come. The gentle slopes have received and retained some of the wash from the upper hillsides, and to this extent they are partly colluvial in origin.

Examination has shown that these shales are somewhat calcareous in local areas, thus exerting an influence which makes the type more nearly akin to a limestone soil in natural productiveness. The application of lime as a top dressing to the heavier parts of the soil has been found beneficial, but it should not be used upon slaty portions or the higher areas subject to drought.

The proportion of the type kept in pasture is from 85 to 90 per cent. Wheat, corn, and oats are the chief cultivated crops. Wheat yields from 10 to 12 bushels, corn from 20 to 30 bushels, and oats from 20 to 25 bushels per acre. Wheat often produces a good yield of straw, but does not head well.

The following table gives the average results of mechanical analyses of the fine earth of the soil and subsoil of the Dekalb clay:

Mechanical analyses of Dekalb clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
12826, 13329, 13331.	Soil	0.8	2.0	0.9	4.3	7.9	49.4	34.4
12827, 13330, 13332.	Subsoil	1.6	3.2	1.3	4.8	8.0	43.6	37.4

DEKALB STONY LOAM.

The Dekalb stony loam consists of from 8 to 10 inches of brown or yellowish loam, underlain by a yellow clay loam or clay subsoil that becomes heavier as the depth increases. Scattered over and through the soil are sandstone fragments and some shale, besides bowlders of various sizes. In all cases the amount of rock debris is sufficient to interfere seriously with cultivation. The texture of the soil varies considerably. The small areas found in the northern part of the county are usually heavier in texture and are covered with less rock than the main portion of the type. In some cases the loam covering contains a greater proportion of fine sand than in the typical soil, owing to the large number of sandstone fragments scattered through it. The value of the type, however, depends more upon the character of the surface and steepness of the slope than upon its texture. In many cases, if trouble be taken to remove the stones, a fairly open field can be secured. But over a considerable area, especially in the southern part of the county, the ground is so completely covered and filled with rock as to make cultivation impossible, and the areas are worthless, except for a limited extent of pasture and possibly some fruit growing. The natural growth is chestnut, chestnut oak, white oak, beech, and poplar.

The Dekalb stony loam is the most extensive soil in the area and occupies the larger part of the county east of the Buckhannon River, besides large areas to the west of that stream in the southern and central parts.

The main area of the type occupies steep hillsides and mountain sides. In some oases it extends over the rounded hilltops, and in the northern part of the county it occasionally caps a ridge or hill. It is always well drained and is apt to suffer considerably from washing.

Yellowish clay shales and very fine grained brown sandstone of the Upshur formation make up the larger part of the rock from which this soil is derived. These occur in alternate layers of varying thickness, and the predominance of one or the other seems to have little influence in changing the texture of the soil. This is in part due to the fact that the soil is formed mostly upon steep hillsides, and the process of weathering, assisted by gravity, has served to mix the products from the two classes of rocks. The larger shale areas, however, usually have a deeper soil and carry a less quantity of rock fragments, so that they are more valuable from an agricultural standpoint. A gray, coarse-grained sandstone is also a prominent feature of the Upshur formation in some localities. To a certain extent the disintegration from this rock has influenced the texture of the soil, but by far the greater influence has been exerted by the direct incorporation of gray sandstone fragments with the soil and the scattering of rocks and bowlders over the surface. As far as texture of soil and natural fertility is concerned the Dekalb stony loam is well adapted to the

growth of all crops suited to the area. Its cultivation and practical agricultural value, however, are greatly limited by the steepness of the slope which much of it occupies, and also by the excess of rock on the surface. In the southern part of the county only a very small percentage of it has been cleared and the most of that is devoted to pasture. Some corn, oats, and wheat are grown, and a little hay. Grain must be sown as well as harvested by hand and the yields are small. Corn upon the best areas will yield from 20 to 25 bushels per acre. The larger part of this soil is best adapted to pasturage, but small areas of other crops should not be neglected. Much may be done in the way of removing the stone from the fields. It is believed that sheep grazing would be fully as profitable as that of cattle. Apple orchards of standard varieties would do well, especially upon the north and east hill slopes, and grapes would probably be a success. The land is valued at from \$7 to \$12 an acre.

The following table shows the average results of mechanical analyses of the fine earth of samples of the soil and subsoil of the Dekalb stony loam:

Mechanical analyses of Dekalb stony loam.

No.	Description.	Fine gravel	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
12919, 13323, 13002...	Soil	1.1	13.5	7.5	10.0	4.6	31.9	31.0
12920, 13324, 13003...	Subsoil...	1.0	10.8	6.7	10.9	4.9	28.6	36.8

AGRICULTURAL METHODS.

The agricultural methods employed in Upshur County are those common to that section of the State, and have developed naturally through a long period of practice. There have been few, if any, important changes in them during the past fifteen or twenty years. The general system of farming in use is probably the best for the area, though in some particulars changes would be beneficial. This discussion of methods applies largely to the northern or so-called lower half of the county, since in the southern half little development has taken place and agriculture is as yet of secondary importance.

Stock raising is the most important industry of the county, and the great part of the land is in permanent pasture. Shortly after being cleared many of the fields were planted year after year to corn or some other crop, with little or no thought of rotation and with no fertilization of any kind. As a result, after a number of years the impoverished fields failed to produce satisfactory yields and many of them were badly washed and gullied. It is still the custom in the southern part of the area to plant corn upon newly cleared land "for as many years as it will stand it." Over much of the county the land is spoken of as "worn-out." Formerly much of it produced corn at

the rate of from 35 to 50 bushels per acre, and yields of from 18 to 20 bushels of wheat per acre were not uncommon.

From this heavy cropping a reaction took place, and at the present time there is a tendency for farmers to allow almost their whole farms to remain in permanent pasture, to the exclusion of even small quantities of other crops except hay. While stock raising should undoubtedly be the primary feature of the agriculture of the county, it is thought that too little attention is given to other crops even for the benefit of the pastures themselves. Many are overrun with ragweed and cinquefoil. It is true that these weeds seem to appear sooner in newly seeded land, and are more persistent than formerly, but in many cases the fields are left without attention for too long a period. It is important that the steeper hillsides be covered with sod for the greater part of the time, but a system of rotation should be devised which will demand the plowing of these when the grass runs out. Organic matter should be incorporated with the soil at every opportunity. Some farmers employ a rotation consisting of corn, oats, and grass for three years. Bluegrass comes in naturally and forms a good sod, especially upon the heavier clay soil. The sod should be retained as long as practicable, but not after it has run down, as is often the case.

The damage from washing upon the hillsides is sometimes considerable, but it is believed that this danger has been overestimated, provided proper care is used in handling the field. A back furrow or small strip of unplowed land left along a hillside will often serve to prevent considerable damage. Little clover is at present grown in any part of the area, and its value as a soil renovator is not generally recognized. Its growth simply as a crop would be beneficial to most of the soils of the area, and if plowed under as a green manure the benefit would be greatly increased. Alfalfa has been successfully grown on the Dekalb clay.

The use of commercial fertilizer in growing corn and oats is becoming quite general and results seem to warrant its use, at least in limited quantities. Little barnyard manure is employed, for the reason that stock in a large majority of cases is not housed even during the winter months. Hay is put up in small stacks in the field and the cattle fed directly from them. Shelter for stock in a climate as severe as that of Upshur County should be the rule rather than the exception, and the present practice should be condemned. The saving of feed would pay for shelters within a few years, and, in addition, a stock of manure would be accumulated, which could then be applied to portions of the farm which especially needed it. The small stock of manure from the horse stables is all applied to the gardens, and they receive the best of care and attention, furnishing a plentiful supply of excellent vegetables through the season. The excellence of the

farm gardens is one of the special features of the area and contributes in no small degree to the healthfulness of the people.

The stock raised is usually of good grade, and consists of the Short-horn, Polled Angus, or Hereford breeds. The calves are either raised or purchased in the county, and are marketed either as 3 or 4 year old steers. The selling age depends partly upon the conditions of the stock and partly upon the feed supply of each individual owner.

The comparatively small area of suitable and naturally productive hay lands in the county makes it important that these be made to yield the largest possible crops. At the present time many of the meadows are poorly drained and are not giving the best returns. Not only is the quantity of the product below the average, but the quality is also poor. Practical proof of the value of drainage is in evidence in certain places, and the use of tile drains for the wet areas is recommended. Not only will it be possible to grow larger yields of hay upon the drained areas, but in some cases the lands will be made suitable for other crops as well.

There are at present but few large apple orchards in the county, and these are given little attention. Many of the rougher parts of the area, especially the north and east hillsides, would be suitable for the growth of apples.

The ideal farm in Upshur County consists of a certain area of bottom meadow land for the production of hay, besides the hill land for pasturage and for cultivated crops. It is this combination which has contributed much toward the prosperity of many of the farmers along the principal creeks and runs in the northern part of the county.

AGRICULTURAL CONDITIONS.

The prosperity of the farming class in Upshur County is somewhat varied. As has been pointed out already in this report, the northern and northwestern sections of the county have superior soil conditions, and in these it is but natural to find agriculture best developed and its people in the most prosperous condition. Here the farm dwellings are usually neat and well kept, although there are comparatively few outbuildings.

Southward from Buckhannon, as the country becomes more rugged, successful agriculture decreases. The farms become rougher and more infrequent and farm buildings less pretentious, and in the southern part of the county there is little attempt to rely entirely upon agriculture for a livelihood, and the hauling of tanbark, or various occupations connected with lumbering, give employment to a majority of the population for at least a part of the year.

One reason for at least temporary prosperity over a large part of the area, both in the best agricultural sections and also in the rougher

parts, is the fact that a large number of coal rights have recently been sold. They were purchased at from \$10 to \$12 an acre.

At least 90 per cent of the farms in the county are operated directly by their owners. This feature has resulted in a majority of the farms being well kept and usually well fenced. When renting is done it is usually upon a cash basis, and the price varies greatly, according to the location and desirability of the holding. Instances were noted in the southern part of the county where the consideration for rent consisted simply of the payment of taxes and the keeping up of the fences.

The size of the farms ranges from 50 to 150 acres, the average being somewhat under 100 acres. Large holdings are few, except in the undeveloped southern part of the county, where several thousand acres of wild land are frequently held either by individuals or stock companies. Each farm usually has a few acres of woodlot upon it. This is not necessary for fuel, since that need is supplied by the abundance of bituminous coal outcropping upon a large proportion of the farms. Coal is sold locally for 3 cents a bushel. Of the total area of the county about 60 per cent is in improved farms, though in the northern part the proportion of improved land is much greater, probably ranging between 90 and 95 per cent. The estimated value of farm lands varies greatly in different parts of the county, and there is little changing hands at present. In the rougher portion from \$8 to \$12 an acre would be an average price for partially improved land. In the better sections farms are held at from \$20 to \$35 an acre, and in some few favored localities, as along Hackers Creek and Turkey Run, some farms are valued at from \$50 to \$75 an acre, but this is not usual.

In a country where stock raising is the chief industry little farm labor has to be hired, except for a limited time in summer, and the number of farmers who have hired help for more than a few weeks is small. The wages of farm labor are about \$1.25 a day during harvest, and 75 cents a day at other times of the year. Usually there is no difficulty in securing labor. A large number of men are employed in the lumbering camps, in which wages of from \$1.25 to \$1.40 a day, with board in addition, are paid. A single team to do the hauling and cultivating is usually all the draft stock necessary upon even the larger farms.

Forest products and beef cattle form the two principal exports from the county. The value of the former is declining at the present time, and that of the latter is increasing somewhat. Sawed lumber and tanbark come from the upper part of the county, and Buckhannon is practically the only shipping point for farm products. The cattle are shipped to Baltimore, Philadelphia, and New York, and many are sold for live export. Small quantities of wool and a few sheep are also shipped. The products used either directly upon the farm or disposed of in Buckhannon consist of hay, wheat, oats, corn, buckwheat,

apples, potatoes, and small fruits. The quantities of these products do not supply even the local market, and grain, hay, and potatoes are shipped in. Dairy products are not important, and there is no creamery within the county. Considerable poultry is raised, and some little truck produced in the vicinity of Buckhannon. Comparatively few hogs are sold in the local markets.

With a somewhat similar general character in all the upland soils of the county, there is little chance for special adaptation of crops to soils. However, in certain general ways, the value of such specialization has been recognized and practiced. Most of the areas mapped as Meadow are kept in permanent grass lands. Upon the loamy or sandy loam portions of the type excellent yields of corn and oats are obtained. It is recognized that, with the exception of the Dekalb loam, the majority of the soils should be kept under sod for a large part of the time to prevent destructive washing. This condition has brought about the existence of the grazing industry as the main feature of the agricultural system.

Upshur County lies somewhat off the main line of travel, and does not enjoy the advantages of a trunk-line railroad. A branch of the Baltimore and Ohio Railroad traverses the county in a north and south direction, and another short branch gives a second route from Buckhannon northward. The Coal and Coke Railroad has recently been completed across the middle part of the county from east to west, and will furnish an outlet toward the southern part of the State not previously afforded. The wagon roads of the area are usually poor. They are repaired occasionally, and for a few months during the summer are in good condition, but for the rest of the year they are full of ruts and holes. Considering the amount of good stone at hand and the very urgent need of at least a few stone pikes, the county is extremely backward in this important direction.

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